Factors contributing to differences in aromatic amine hemoglobin adduct levels

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A series of studies were performed to investigate the effects of smoking, exposure to environmental tobacco smoke (ETS) and other environmental factors on the levels of aromatic amine hemoglobin (Hb) adducts. Significantly higher Hb adduct levels of *o*-toluidine (2694±233 vs. 2210±603 fmol/g Hb; $p<0.0001$), *p*-toluidine (2940±296 vs. 1841±117 fmol/g Hb; $p<0.0001$), 2,4-dimethylaniline (210±24 vs. 154±13 fmol/g Hb; $p<0.018$), 3-aminobiphenyl (17.7±3.3 vs. 8.0±0.7 fmol/g Hb; $p<0.001$) and 4-aminobiphenyl (54.7±8.9 vs. 26.7±4.1 fmol/g Hb; $p<0.0001$) were found in smokers (n=27) compared to nonsmokers (n=73). Significant differences were not found for Hb adducts from aniline, *m*-toluidine, 2-ethylaniline and *o*-anisidine. Self-reported paternal and occupational exposure to ETS did not increase aromatic amine Hb adduct levels in non-smoking pregnant women. Similarly, smoking within the home did not significantly increase 4-aminobiphenyl (4-ABP) Hb adduct levels in children. However, 4-ABP Hb adduct levels were significantly higher in children living in urban compared to rural environments (31±1 vs. 21±2 pg/g Hb; $p<0.001$). High background 4-ABP Hb adduct levels were also found in laboratory animals with no known exposure to 4-ABP. Since oral supplementation with *N*-acetylcysteine reduced 4-ABP Hb adduct levels in nonsmokers, it is suggested that unknown dietary factors may also modulate adduct levels within the general population. [This work was partially funded by the German Research Council for Smoking and Health]

Source: https://www.industrydocuments.ucsf.edu/docs/kxmj0001